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on this point. The youngest intrusion of all is represented by the leucite-tinguaite-vitrophyre.

It is to be noted that the process of differentiation here described, inasmuch as the more acid facies of the elæolite syenite occur on the periphery of the mass, differs from those described by Brögger, in which the more basic constituents have tended to migrate toward the cooling surface. This difference, coupled with the fact that the authors refer only once, very casually, to the whole intruded *massif* as a laccolite, gives cause for regret that they were not able to devote more time to the study of field relationships than was actually at their disposal.

F. L. RANSOME.

Geological Survey of Canada. G. M. DAWSON, Director. *Ann. Rept. U. S.*, Vol. VII, 1894. Ottawa, 1896.

The summary report of operations is followed by a report on the area of the Kamloops map-sheet by Dr. G. M. Dawson, a report of an exploration of the Finlay and Oomenica rivers by R. G. McConnell, a report upon the country in the vicinity of Red Lake and part of Berens River, Keewatin, by D. B. Dowling, a report upon a portion of the eastern part of Quebec, by R. W. Ells, with a chapter upon the Laurentian north of the St. Lawrence, by F. D. Adams, a report upon the surface geology of portions of New Brunswick, Nova Scotia, and Prince Edward Island, by R. Chalmers, and the usual statistical tables and notes on the analyses and collections made.

Within the year an important change in the management of the survey occurred, Dr. A. R. C. Selwyn, who had served as director since the retirement of Sir W. E. Logan in 1869, being granted leave of absence and the following January receiving superannuation. Dr. G. M. Dawson, his successor, was recalled from the field early in October and has since been in charge of the work. Twelve parties were in the field. Dr. Dawson himself spent some time in the Kamloops and adjoining regions investigating recent mining developments. In the Cariboo mining districts the study of the changes in drainage consequent upon glacial conditions was undertaken as likely to yield important results as to the distribution of the auriferous river gravels. The history of these gravels and their association with the glacial beds is traced in detail in the Kamloops report. Mr. R. G. McConnell spent the season in the foot-hills of western Alberta and in the southern part of the west Kootanie district. Mr. J. B. Tyrrell conducted an expedition through the "Barren Grounds," but owing to the short time which elapsed between his return and the publication of the report, only brief notes on the trip are given. A somewhat fuller account of the expedition of 1893 is, however, inserted. Dr. R. Bell and Mr. W. McInnes spent the season in Ontario on work previously begun. Among other points, Dr. Bell determined that the gneissic area between St. Mary's River and Gonlis Bay is not connected with the granitic tract lying to the northeast, but forms an isolated mass. Dr. R. W. Ells was engaged upon work along the Upper Ottawa and adjacent regions. Some interesting points of structure were observed at various places. While it is very evident that the syenites or granites, as a whole, in this section are intrusive in the crystalline limestone, some portions of them are of comparatively recent date. At one point they have disturbed horizontal beds of Calciferous and Chazy, and at another have penetrated and altered the Potsdam. Mr. A. P. Low spent the seasons of 1893–4 in exploring the interior of Labrador and his report, when it shall be completed, promises to correct the popular notion that Labrador Peninsula is a waste, barren region totally unfit for habitation. One of the important results of the exploration is the discovery of a great tract of Cambrian rocks carrying rich beds of iron ore. The striæ of the region show that the ice of the glacial period flowed off in all directions from the central area. Mr. R. Chalmers concludes as a result of the season's work that the facts altogether demonstrate that Nova Scotia has been glaciated entirely by ice which gathered upon its own surface, and afford no evidence of a great ice-sheet crossing the Bay of Fundy and overriding that peninsula. Mr. Whiteaves reports that the second part of the third volume of *Palæozoic Fossils*, consisting of a monograph upon the fossils of the Guelph formation of Ontario, is completed and ready for publication.

The volume as a whole is well printed and well illustrated and forms a most valuable addition to the literature of the region. The area in which the Canadian Survey works is not only one of great extent, but also of great complexity. It is furthermore to a considerable extent unsettled and unexplored. As a result, the cost of geological investigation is relatively high. In view of these facts, and the known wealth in mineral resources of much of the partially explored country, it would seem that the director's plea for larger appropriations is well founded. It is to be hoped that the government will find itself able to rapidly expand the work and give the new director adequate means for the remarkable opportunities for investigation which the region affords. H. F. Bain.

Proceedings of the Indiana Academy of Science, 1895; Geological Subjects.

Six papers on purely geological topics were read before the Indiana Academy during the year, besides a number of others of more or less interest and value to geologists. The most important geological paper of which an abstract is published is that by A. H. Purdue upon the Charleston, Missouri, earthquake of October 13, 1895. The shock or shocks of that earthquake were of sufficient force to break plate glass windows, crack brick walls, and to throw down brick chimneys at several places, and it seems to have been felt over an area of more than 400,000 square miles. The author might have called attention to the fact that within the area affected there are a score or more of colleges and universities at which geology is taught, but that not one of these institutions had a seismograph or seismoscope in working order, and that there were therefore no accurate observations made upon the time or nature of the shocks.

In "Some Minor Eroding Agencies," by J. T. Scovell, attention is directed especially to the work of burrowing animals: ground hogs, gophers, badgers, prairie dogs, cray fishes, and burrowing insects of various kinds. When Mr. Darwin mentioned the geologic importance of earthworms it was generally thought that he was making the most of a very small affair, but when his data were completed every one was amazed to find the results so important. Mr. Scovell's points are doubtless well taken, but if he will make and record his observations in such a manner as to give them a *quantitative* value, he will do the science of geology an excellent service. In some instances this is impossible, but in others it is not.

It is cause for congratulation that the legislature of the state of Indiana recognizes the importance of coöperating with the State Academy of Science. Show us a state in which the legislature and the people demand of the scientific men scientific results, regardless of whether they have immediate "practical" value and we will show you a state that contributes its full share to the advancement of science and of civilization. J. C. B.